

Field Trip
April 23-27; Oct. 25;
1957

April 23

Visited Dixie Hills. Went to Windmill section. Concluded we had landslip blocks.

They went to my Artinskian locality. Collected them went to shale just under east margin of two high knobs. Went up to Hess ledge which forms the east of Dixie hill. Saw a landslipped block on the east face of Dixie hill. Spiryndiophora common just above the Hess ledge and possibly present in it.

Afternoon went over to center of hills to see my second Artinskian bed. In Hess float here, and in Hess west of here, some blocks with silicified Coscinopora. Suggests that so-called Coscinopora shelf may be not in place.

Late afternoon visited James Artinskian locality. This is on W side fault about $1\frac{1}{2}$ miles NE of Lemox. The lower 200' of Wolfcamp is mostly massive, broken limestone with numerous fossils at base. Spirifiles are common and extend up at least 150'. Fusulines are common about 200' of cong. above in w.c. Hess ledge hard to see at this place but shaly blocks with Spiryndiophora seen above the Hess ledge which is difficult to individualize.

April 24

North of Hess Ranch the

I cocchimella beds are faulted
against dolomites which King
says East Hess foresh.

Found Paraceraspis loose about
 middle Hess Ranch Horst section. This
 section unusually long and may be
 mostly high Wolfcamp, some higher than
 hitherto believed.

Wolf Camp Hills

Provencher just under bed to oblique
 creek elbow. Seems to be just above
 continuation of 12 ft. does not seem
 to be the bed above 12. It is
 bed is above the ls forming creek
 bed at elbow. It is probably about
 to 12? Better use my own numbers.

This bed is 80 paces N (upstream)
 from elbow of creek, where creek
 forks. Check notes for position and
 Cooper number.

~~Yugoslav furnished paper for down~~
 Information on collecting sacks
 for dinner.

✓ ~~Send dinner fusions from Hess~~
~~ledge~~

0484

October 25

Oct 25 - small patch of yellow limestone surrounded by bioclastic gray beds.
~~Dances think it is glacial and thought~~
The fossils had a Wolfcamp look.

Oct 25' - just on east side of fault yellow beds underneath thick ledge of Hess. I think this is upper Wolfcamp underlying the Hess.

Oct. 25³ - Fusuline sample taken on west nose of hill above Wolfcamp shale above Artinskian locality. Specimens from dark limestone lying on top of Hess ledge. At this place normal yellow platy shale appears at the top of the Hess ledge.

7032
701m

225

256
257
258

Glass Mtns.

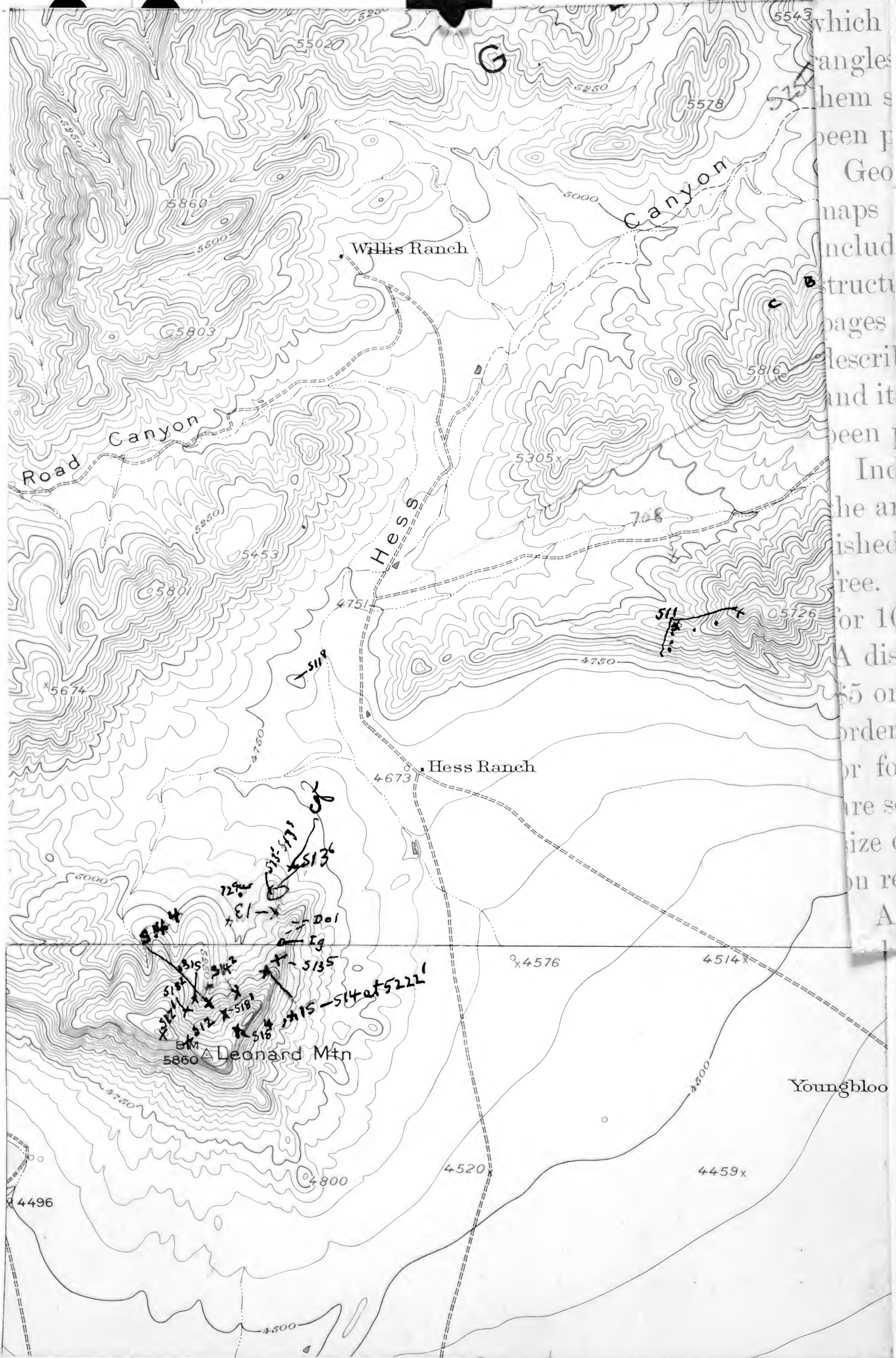
September 1957

0442

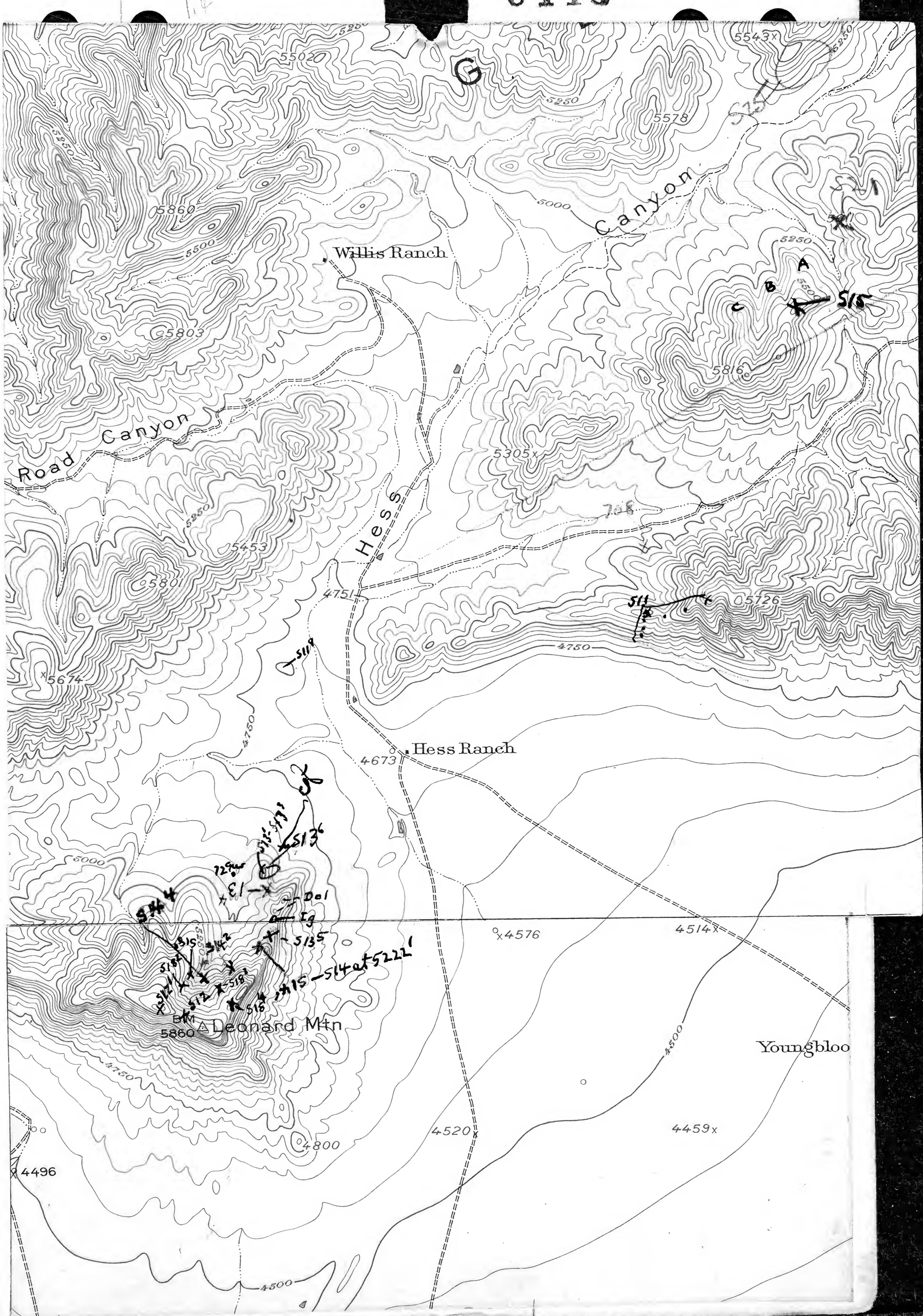
- Hess Ranch 2
Leonard Mtn. 4, 7, 9, 17
Hess Ranch Past 15
Neal Ranch E of Splitbank 16
Dene Hills 20, 23, 29, 30
Naside Dene Hills 25,
Windmill Hill 26, 28
Hess - Ward #4
Willis Ranch 15
Santa Anna 1

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0443



0443



More

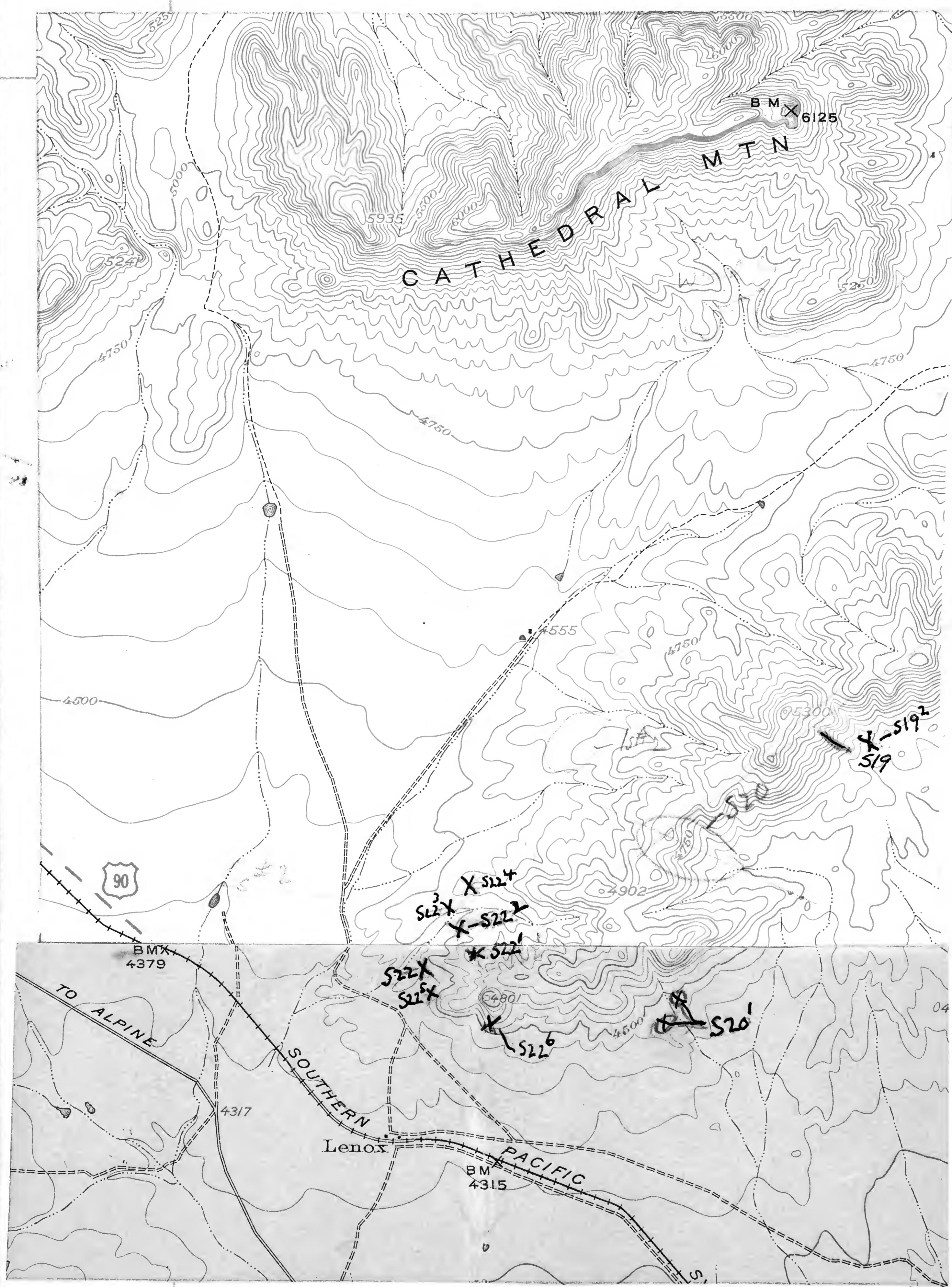
soon sun

P

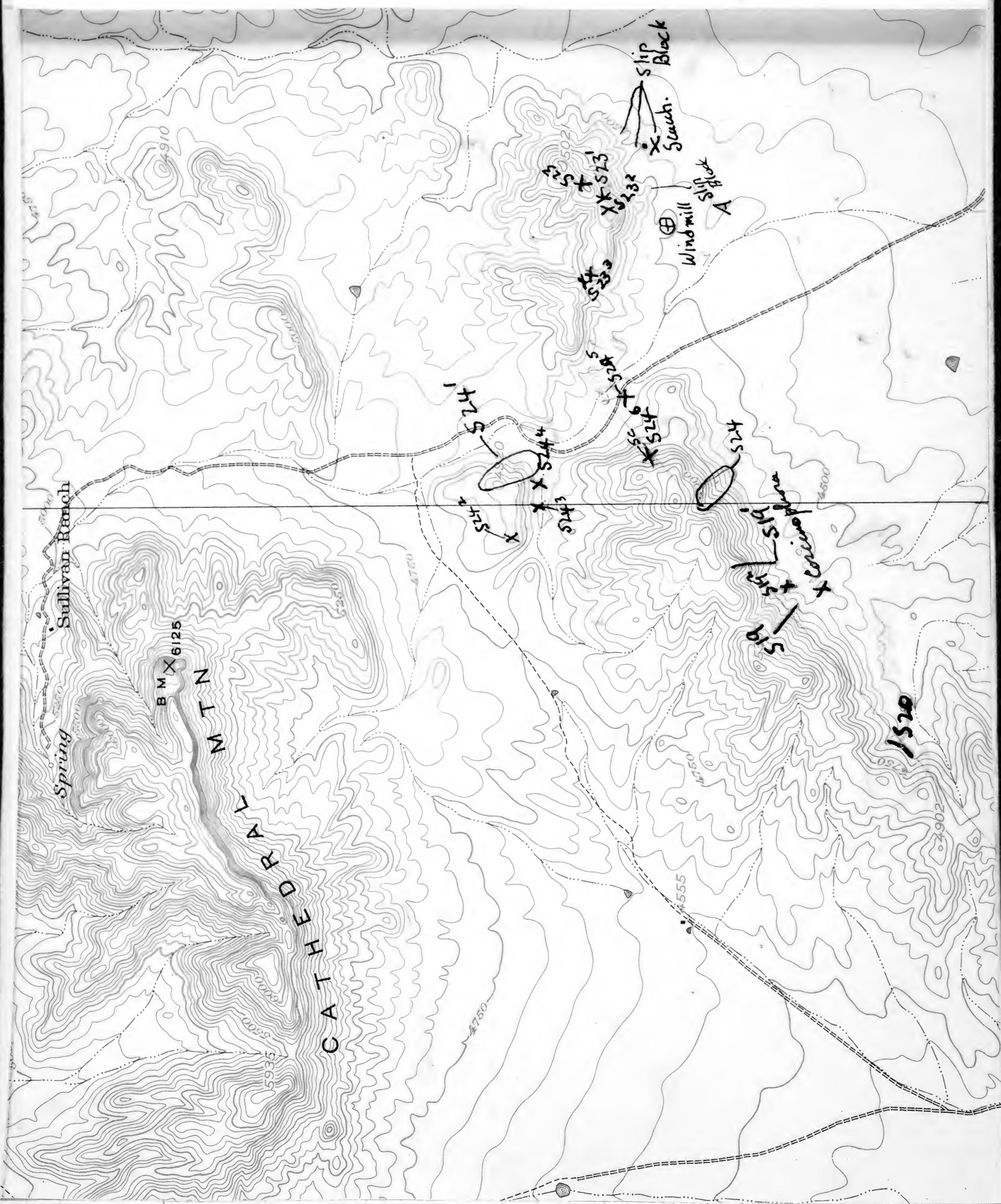
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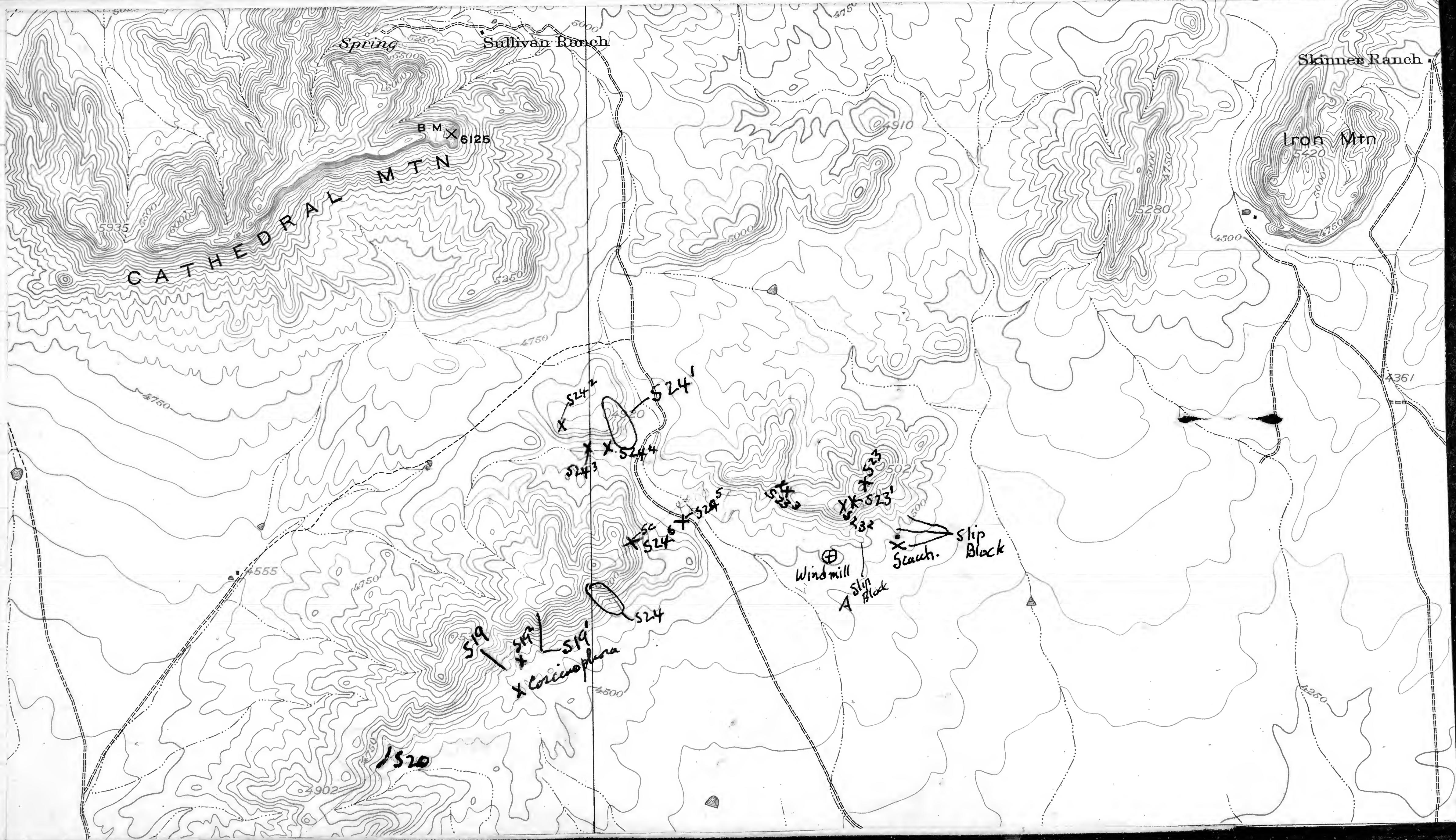
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0444



3445



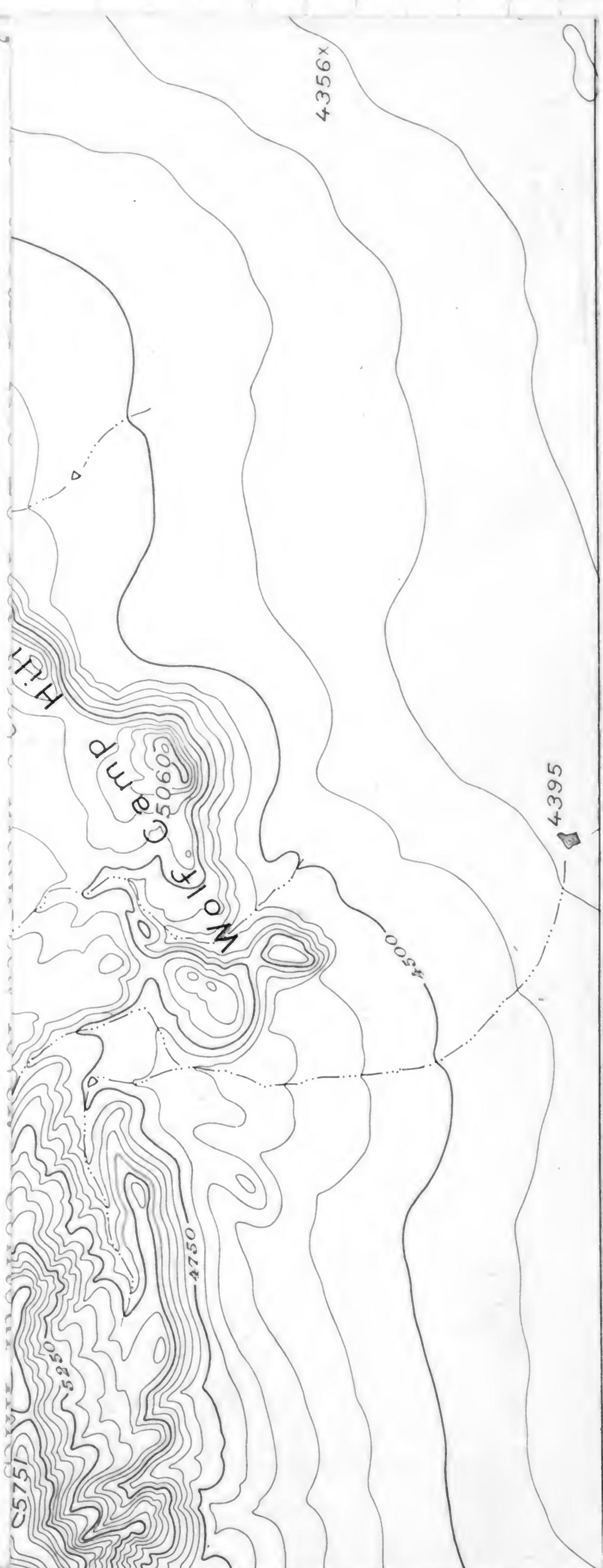


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301
4044~~

~~193
301~~

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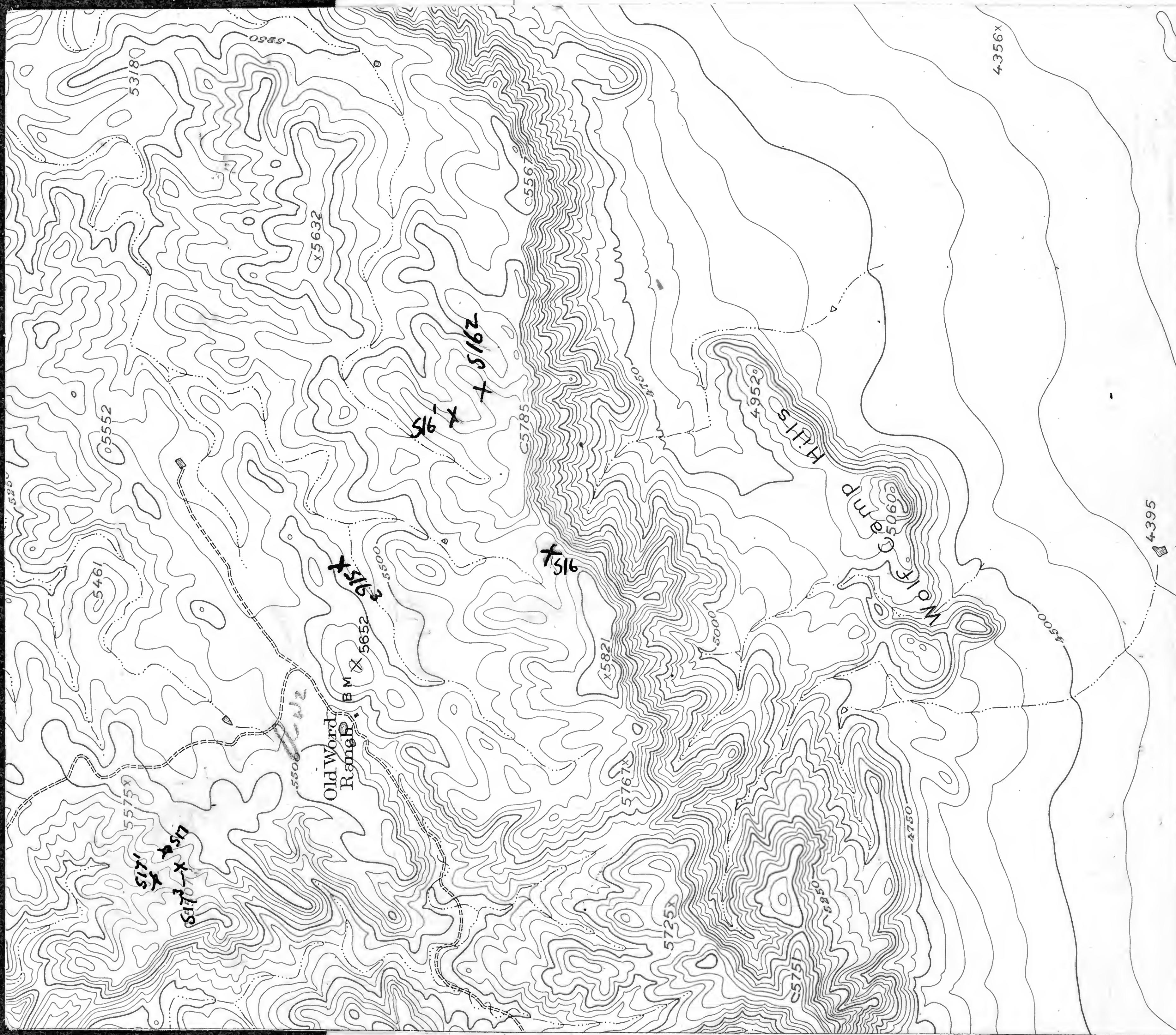
0446



show the shape of the hills, mountains, and valleys, as well as their altitude. Successive contour lines that are far apart on the map indicate a gentle slope, lines that are close together indicate a steep slope, and lines that run together indicate a cliff.

The manner in which contour lines express altitude, form, and grade is shown in the figure below.

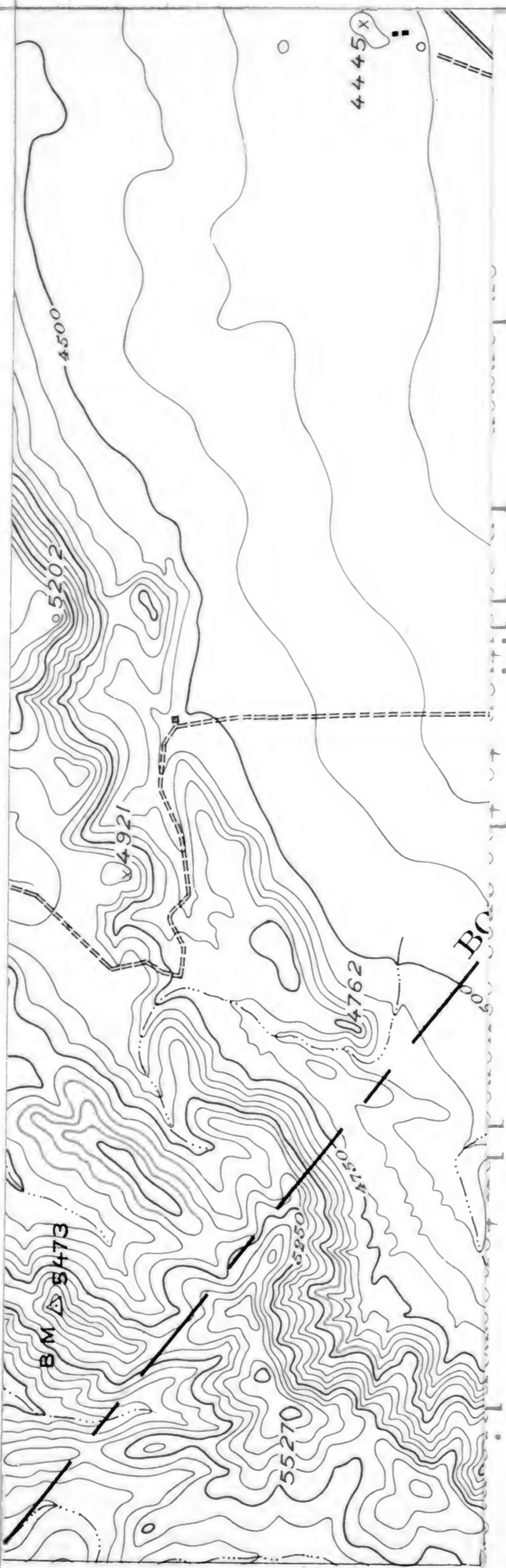
0446



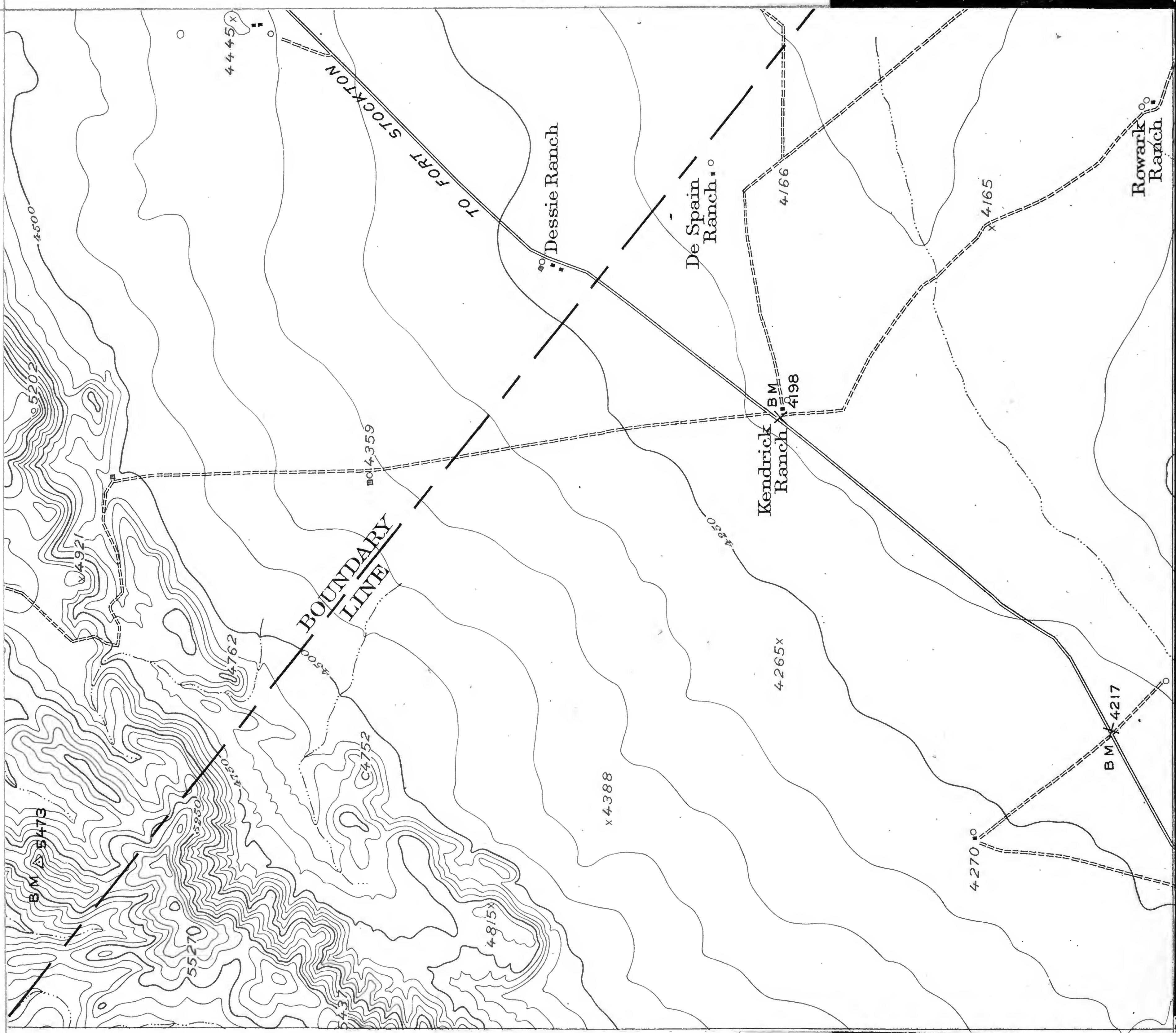
3125

0449

"Alaska," "Alaska," "Alaska," "Alaska," "Alaska," "Alaska," "Alaska,"
the regular topographic maps, which show relief as well as
drainage and culture.



0449



0450

(1)

Sept. 10

Section on US 67, $1\frac{1}{4}$ miles east of junction with Texastown Rd and $1\frac{3}{4}$ miles east of center of Denton area.

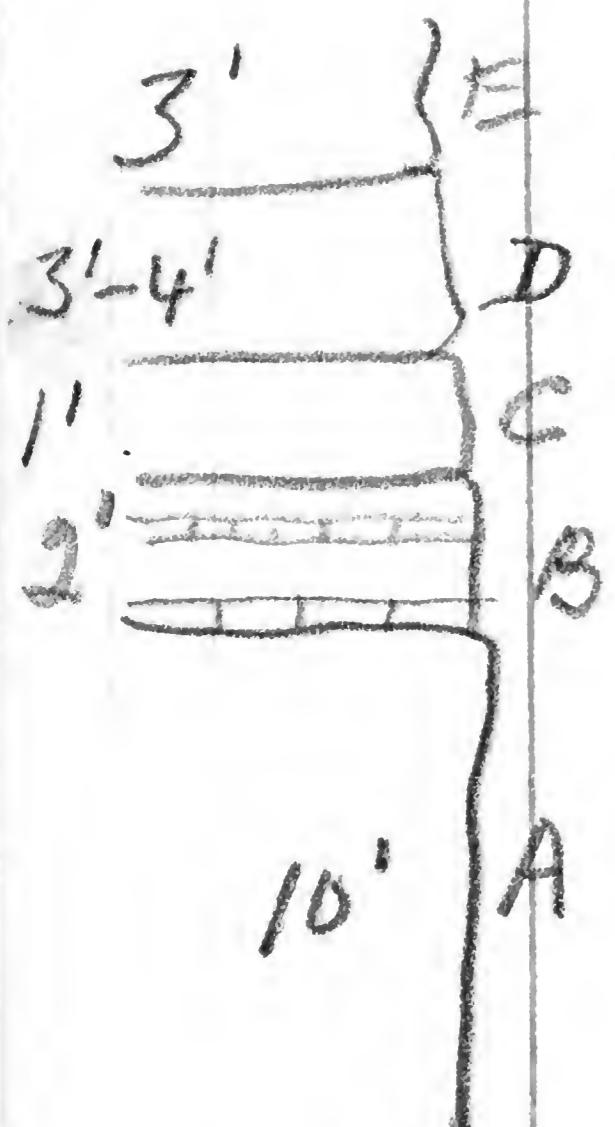
A.- Shale soft friable mostly blue gray weathering pink in places. Large concretions common, large Derbyia. Scattered thin ls. beds & lenses.

B. Thin limestone separated by shale as below. Bryozoan, Wallerella, Cleiothyridina. Several layers of limestone, basal one about 6"-8" thick. Irregular yellowish, irregular surfaces.

C. Hard brown limestone 1' thick

D- Mealy limy shale & thin ls. with crinoid stems. Upper ls bed about 3"-4" thick.

E Shale 3' weathering red.



(2)

Sept 11, 1957

East of Hes. Ranch

285' above top of Knob in big hill in top
of 10' mass of dolomite this is at about
530'

Dip on hill N 70° W 10° N

Slope above Knob 250' is mostly bedgy
 light gray dolomitic limestone
 Fossils few, mostly fusulines and
 mostly nearly destroyed.

709d

	S 11 ¹ - - - 4961'	
e	S 11 ¹ - - - 5091' ✓	Crassitextoria}
f	S 11 ² - - - 5174' ✓	"
g	S 11 ³ - - - 5194' ✓	"
h	S 11 ⁴ - - - 5200' - also goniatite	"
i	S 11 ⁵ - - - 5220'	
j	S 11 ⁶ - - - 5250' top of hill	
k	S 11 ⁷ - - - 5260'	
m	S 11 ⁸ - - - 5418	

Went N up hill with knob at 5250
 and saw west facies of Hess. Mostly
 granular gray weathering limestone
 often with algae resembling fusulines.
 Little or no dolomite seen throughout
 hill from 4961' to top at 5250'.

Went east of knob up hill ending
 at 5726. Went to west end of knob
 ending at 5677. The west facies
 type of rock appears for a short
 distance up hill east of knob but
 disappears at about 5300'. Above
 this the rock is mostly dolomite,
 fairly heavy bedded but with
 occasional lime bed. Found only
 one undolomitized fusuline bed.

0452

(3)

5119 - visited road 3 $\frac{1}{4}$ mile N of
Hess Ranch. Lower part of bedded
bedded dolomite. Hill capped with
intercalated yellow siliceous shale
with thin limestone. All rocks much
altered. Few fossils. Saw Stenocardia
and Ammonites. This appears to be Leonard.

Barnie Wilde says 511 may be
Wolfcamp.

12/14/95

(4)

September 12.

Leonard Nitro.

Bivalve teeth seen about 1/2 way up in loose block.

10' above conglomerate of WC comes a 2' bed of sandstone with chert pebbles. This is identical to the rock containing ammonoids on Dugout Mountain. The bed seems to be local?

27' interval between cyl & light gray ls. consists of scattered *Reticularia* & algal bioherms, very irregular, shaly and shaly ls. Abounding in large fusulines.

27'-50' granular ls like Hess West facies but with big bioherms, with large Leptostrea at about 40'.

50'-92' - granular limestone, different from last frier than below. Big miliols at 90'.

92-125' Similar granular limestone light gray to white when broken. Bioclastic banks still present, bioclast.

125-152' mostly covered probably same as below

152-202 - Mostly massive granular limestone of Hess West facies. At 202 the dolomite of the great cliff comes. This 50' zone is a fine sand, contains fusulines.

0454

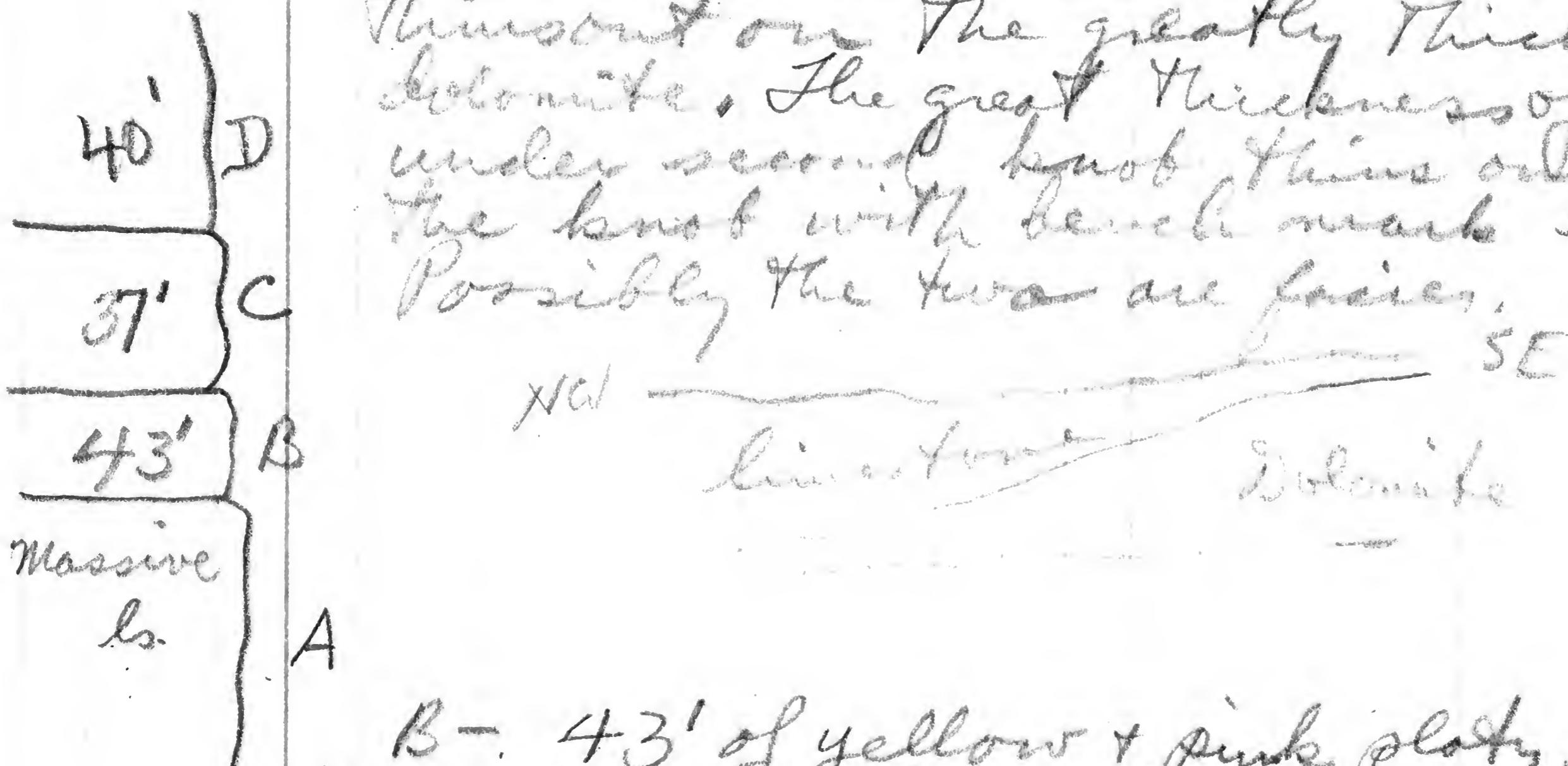
(5)

At base of thick dolomite is about 10' of cyl. lgl dolomite, suggesting alternation of a ls. cyl. I am wondering if the big mass is a sand bldc the top of WC and may be WL.

South side West Knob
Leonard Mtn

Knob rests on massive Leonard limestone rather than a dolomite

A - Massive limestone with scattered pebbles. Sponges, bryozoals, bivalves looking SE from this part of Mtn. The dolomite we came thru which was so thick thins west and seems to pinch out. At same time the thick St. L. ls under the Knob thickens west and thins out on the greatly thickened dolomite. The great thickness of ls under second knob thins out on the knob with bench mark 5860. Possibly the two are frater.



B - 43' of yellow & pink platy shale, the characteristic Leonard shale.

Under the second knob there must be 75-100' of limestone, but under the eastern knob only a few feet.

(6)

C - 37' massive detrital ls. with pebbles. Scattered fossils.

D. 40' of platy shale interbedded with dark gray granular limestone in beds ranging from a few inches to one foot or two feet.

The 5860 knob is about 60' of limestone above the dolomite which includes the Lytidiscus beds. The dolomite seems to me to be a secondary development.

709m 512 - comes from saddle between knobs of Leonard mtn.

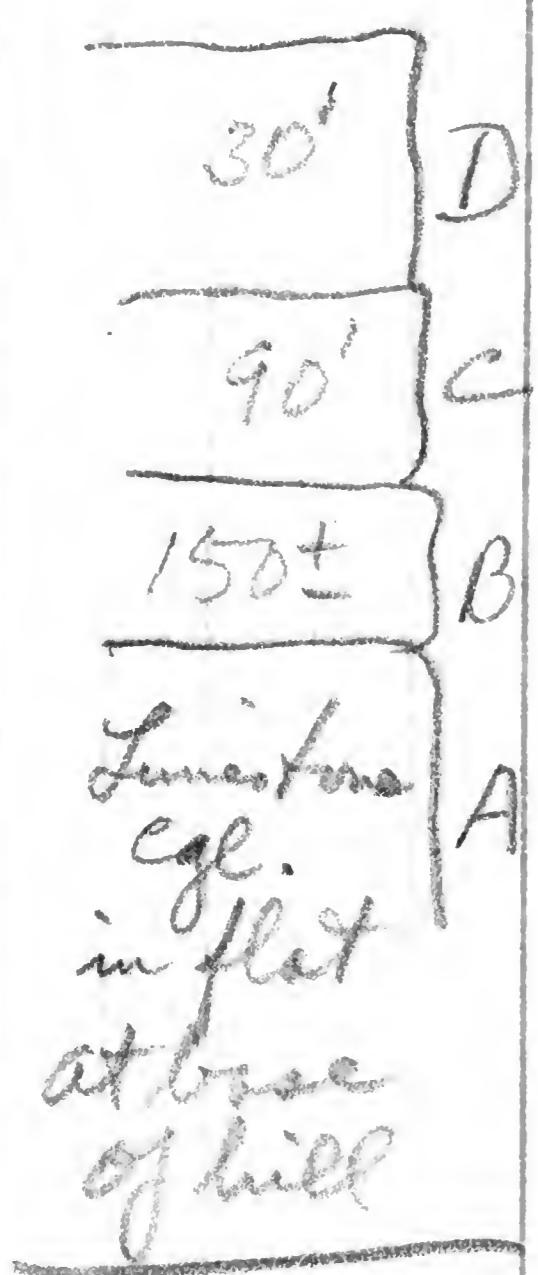
7090 512' - Bed D of section on west knob of Leonard mtn. Dolomites form very crest of knob.

When going down the section on leaving the hill I found a loose specimen of *Omphalotrochus* in the thick dolomite. This may have some bearing on the section on the small knob at the northeast end of Leonard mtn.

(7)

September 13.

Small Knob on N side Leonard Mtn.

^{Top of Knob}
715V A - Limestone cgl of Wolfcamp.

B. - Bioclastic ls. strongly resembling Wolfcamp. Contains *Belemnites* ? *Planorbis* ? Fusulines coll. S13 = 715V 85' below tops of knob? Patches of dolomite

C. Flat-bedded ls. possibly 25-40' with *Saccatinaella* and other fossils suggestive of H.R.

D. Cliff-making ledge of light gray, presolidic & detrital ls. with many fusulines. Colls:

S13'	- base of ledge	709p
S13 ²	- 15' above base	709g
S13 ³	- very top of ledge at	709r

Slope just S of Knob is of Wolfcamp type rock, massive with smooth patches. Also patches of dolomite Coll 5134 = 709s

Just south of Knob we go up slope with dolomite knob on it. Whole slope underlain by WC lithology, also suggests the Hess ledge. Crinoid stems 1" across.

⑧

709t

513⁵ just south of igneous body in saddle just S of Twin Knobs. Conglomerate which I take to be the top of the cgl of

The WC appears just S of igneous body in saddle. To South the cgl is overlain by fossiliferous WC in places shaly and shedding loose fragments. Trinitella is common in brittle limestone. Elevation is about 5200.

The section seen today helps to solve the puzzle N of Hoss Ranch. I suspect that the beds just N of the Hoss house belong to uppermost WC and the HR beds are lowest Leonard. The beds at the small knot on NE end of Leonard occurring between the cliff and the Wolfgang appear to be HR and they also have strong suggestion of the beds on the back slope of the Hoss Ranch Horst. They also suggest possible assignment to the Hoss ledge on the ~~discre~~ place. They are not in accord with the Synderophora beds at top of Leonard mtn. These beds with HF fossils may actually be in the dolomite of the SE face, the oyster shell rocks seen there in 512 being supporting evidence.

2 blocks from 513⁶. = 709u

(9)

September 14
Leonard Mtn
4 miles Leonard with.

- 1 - back slope from Hess Ranch
- 2 + 3 - East face from $\frac{1}{2}$ mile S of
Hess Ranch
- 4 - Small knob on NE side Leonard
mtn.

At the south angle of the small knob the HR thick suddenly from 90' on N end of hill to only 10 or 15' at S end. From N end of knob we go SW on slope from two knobs. WC is exposed on N end of slope at knob. A few rods W the rounded massive WC is covered by thin platy beds of HR with Scacchinella and large *Omphalotus* rocks. This is only a skin on the WC. Then come heavy-bedded platy limestone like that off the crest of the knob. It looks as though HR thins out southward & SW on the massive WC.

Just N + W of gully heading into twin knobs and about middle of slope (E-W line) between twin knobs rock is all dolomite. The dol changes from platy to massive to the south. On N slope of gully @ the dol, has long ~~lenticular~~ stems as ghosts and suggests the upper WC massive beds.

At 5100' in gully Dol come on conglomerate, WC col. here somewhat sandy. Probably near top of cgl.

(D)

Ig. Igneous rock on slope at 5200' just under 1st knot S of Twin Knobs A on map. Down hill is L. cyl & platy silex float. L. cyl in place. Above Ig. massive massive ls. probably WC. and knot formed of dolomite which is part of the main dol. on the front.

Dike extends to a point under knot A. Looking N from near knot A. The Lower bedrock forms a loop on the NW side of Twin Knob, on flank of west side.

709v 514 - 530° E of Knob A, in sandy cyl. at 5222'

709w 514' - Under Knob at about 5280' patch with abundant fusulines. Contains also reefy patches of *Spiriferina*, *Micrabella*, *Reticularia*. The Knob which is dolomite, undoubtedly belongs in WC as it overlies the level. The WC on this Knob makes a loop which ends at about the base, below which we have upper cyl of the WC.

Just W of 514' we come into cyl on slope but next small ravine opposite saddle between Knobs A + B seems to be WC. Lamellar algal is seen in this small ravine on west side Knob A.

0460

709x

(11)

S14² - West side of first gully under big knob B. Big road between A & B all Wolfcamp except for cgl seen between S14¹ & S14² near S14¹.

Slopes between 3 small gullies just on N side of Knob Base all massive dolomite. Just on W side big gully just west of S14² we come into massive limestone again.

Slope just N of saddle between knob B & 5860 is mostly dolomite but with patches of limestone. Here we found a loose *Diplosoma defuncta*.

709y

S14³ just S of King's loc 207 on long slope between ravines the major west branch on the left of the locality, many loose sponges of the H.R. type

7092

S14⁴ A massive ledge of limestone containing numerous sponges and brachiopods. This combination suggests the Leonard. These may not be in place

714a { A-514⁵ - In westernmost gully, about King's loc 207 at 5200' in gully about 25' of bedded detrital ls with large fusulines, I think this is low in post cong. W.L.

A 5200-5227 Same as above but top in massive ls.

5200-5222 covered

5232-5243 - massive granular ls. light gray weathering

(12)

5146
7146

5243-5248 covered

5248-5273 - Massive granular ls with bluish patches. Still looks like W.C.

Heas
Ledge
5149

5273-5289 covered except for about 2' of granular ls.

5289-5321 - mostly covered but with one siliceous bed.

5321-5332 - massive ledge abounding in large *Spongites* & curly bryozoans all strongly reminiscent of H.R. locality

5332-5359 - mostly covered but thin at top containing bivalve fossils but I could not identify them.

5359-5419 - mostly covered but containing thick plates of granular ls like the thin beds of H.R.

5419-5485 - mostly covered but 5' of yellow Leonard Shale at base. Heavy ledges scattered

5485-5550 - Heavy massive ledge of granular light gray limestone. Above this limestone comes the thickness measured on the West Knob of Leonard Mtn on 512.

In the heavy beds here I saw smooth layers with Ediosteges. These look very much like the Limbella in the Wolfcamp.

32
5
160
14
174

0462

(13)

About 20' above massive *Saccatella* bed are thin to about $\frac{1}{2}$ ' thick with *Liprodium*, *Saccatella*, *Composita* & others like H.R. The H.R. beds must go up at least to the shales.

Big Helicopora is abundant in the H.R. Beds. One large *Defordia* type found loose.

Collecting in Knob on NE side Leonard mtn. Handlevelled to base of cliff from top of conglomerate in valley. The hill is about 204' high. The Conglomerates are therefore at about 4796.

714c S147 = Wolfcamp 20' below top of small Knob NE end Leonard mtn. = S13

Picture 5 = Thinning H.R. at end of small Knob at NE of Leonard mtn.

714d S148 = 1 foot above massive WC in base of H.R., here about 20-40' thick thin bedded. Small Knob on NE end Leonard mtn.

714e S149 - *Saccatella* reef = King's loc 207.

714f S14¹⁰ 10-15' below top of massive WC north end NE Knob of Leonard mtn.

714g S14¹¹ - 5 $\frac{1}{2}$ ' below top of massive WC ledge, north end Knob at NE of Leonard mtn.

(14)

On leaving the slope with large Scacchimella we angled off the hill to the NE heading for the point where the gullies joined. Down the hill and along the major gully we encountered dolomite massive, with Leonard stems which suggested to me that here the WC has been dolomitized. This is evidently the N pointing spine of King's Hess (East facies).

I think the dolomite in Leonard mtn should not be regarded as a special facies because it is patchy, irregular in distribution. In one place we collected WC fossilines in good ls a few feet from the point where it passed into dolomite.

The dolomite shows various degrees of mineralization from just faintly dolomite to strongly dolomite. In places recognizable fossils appear in the dolomite that have not been destroyed.

(15)

September 15

Up back slope of Hess Ranch Horst.
 Big knot marked C seems to be
 mostly ls in the lower part but the
 N crest is dolomite. The limestone
 appears to run up into dolomite. The
 small intermediate knot marked B
 is mostly dolomite, especially on the N
 facing slopes.

Knot A is mostly very massive
 limestone, calcarenite.

714h S 15 - fusulines from bed of dark limestone
 on top of hill $\frac{1}{2}$ mile NE of hill 5816.

After this stop went to low hill
 about $1\frac{1}{4}$ miles NE of Willis Ranch.
 Limestones altered and fossils poor.
 Also visited nose of hill one mile
 S of Willis Ranch. Bed #1 at this
 place consists of massive limestone
 poor in silicified fossils. Two blocks
 taken here in 1956.

Visited 708 but in $1\frac{1}{2}$ hours of
 collecting could find no good blocks.

0465

(16)

September 16
Neal Ranch
Mr. & Mrs. Wren Hall
Marathon, Texas

Send pictures of fossils.

S16 Algae surrounding fossilines

S16¹, S16² fossiline samples on long dip slope of Head. S16³ produced from dip slope. Spent all morning in a vain effort to find Kings fb south of old Word Ranch in vicinity of Hall 5785.

The dip slope of the Head is of various degrees of dolomitized limestone often elongating in fossilines well preserved in the limestone but just ghosts or cavities in the dolomite.

In afternoon worked on a special block at Split Tanks but failed to get it.
All in all it was an unprofitable day.

$$S16 = 7 \frac{1}{4} i.$$

$$S16' = 7 \frac{1}{4} j$$

$$S16'' = 7 \frac{1}{4} k$$

0466

(17)

September 17

714m 517 - Fusulines high in Word #4

Hess Ranch foreman is Enrique Garcia.

Walked over acres of Word 4 much of it dolomitized, much of it unfossiliferous and much of it with thick masses of chert. In places the rock is made up of fusulines. Collected on a hillside about $\frac{1}{2}$ mile = 517³ west of road

517' - Fusuline pieces from near 517³.

September 18

Leonard Mtn

Bacchiniella located on side of hill (518 at 5200'), This is N60°E of knob B + N75°E and on knob C at N35°E. Here we are 50' above the stream. About 750' W comes fine Bacchiniella bed at 5300' where we saw it on 514⁶

714p = 518'

At 5335 on slope along gully a massive ls contains many cup-like Leptodes, suggestive of those in the Hess ledge. Also present are large Diplomedes, fine-lined Streptorhynchus like those in the Hess ledge. With all these are numerous Defordia sponges. This occurrence strongly suggests the Hess ledge of the Delle Hills.

(18)

The Hess ledge differs in being very conglomeratic

714g

Scacchinella bed on slope at S18² at 5426' just north of a small block of dolomite. Collection made

5529' patch of ss.

5535 *Scacchinella* seen in place runs into the thick dolomite in about 50-75 yds. From *Scacchinella* to top of hill in saddle 151' makes saddle 5686'. The *Scacchinella* is actually thus about 5549'

Dip near end by sight on west knob of Leonard Mtn. is 7°. On the east knob it is 14°, both to north

7145 = S18⁴ - fusulines on nose of Knob B = 5758' - Specimens taken by nose at about 5720'. The *Scacchinella* bed goes into the dolomite at about the middle. A tongue of dolomite about 30 or 40' thick extends into the bed for about 100 yards 75' above the *Scacchinella* at S18³.

The *Scacchinellas* collected at S14⁴ as well as the sponges are out of place and probably came down from S18²

Directly above *Scacchinella* at S14⁶ about 50' is another bank of *Scacchinella*. This breaking thus occurs through an interval of at least 50'. This upper level

(19)

Abounds in crinoid stems and thus resembles $5\frac{1}{8}^2$ where we collected. $Quag 1\frac{8}{2}$ is thus near the top of the *Scacchinella* interval. Above this interval is bedded dark granular ls in beds 6" to a foot thick.

185 up *Scacchinella* at 5350 just at point on hill where it levels off to North. Blaty rock for about 50' above this ledge where light granular ls appears. This may be the point where King's fault runs through.

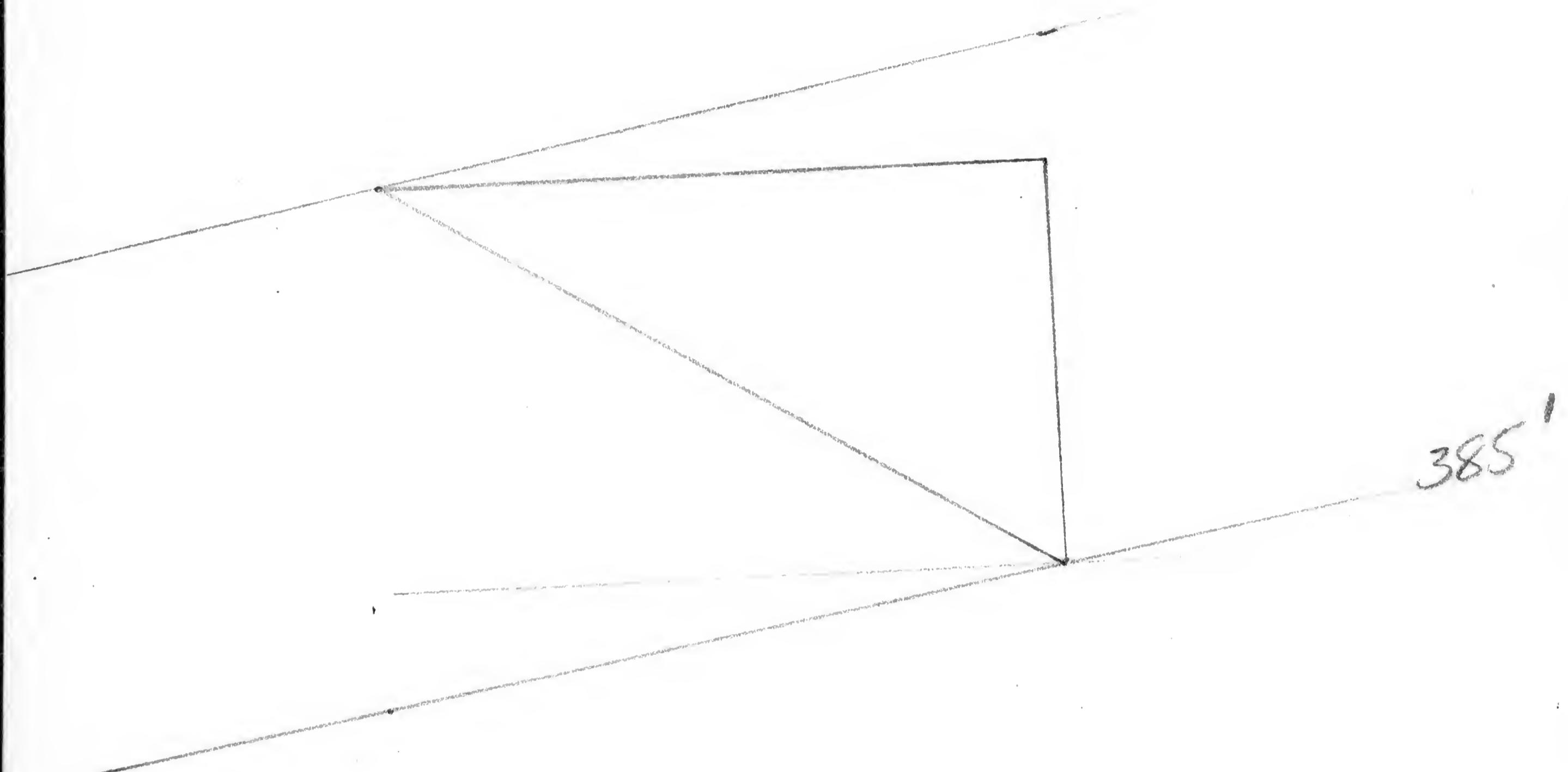
Scacchinella bed appears at 18⁶ which is 0.1 mile + from end of small knob on NE side Leonard Butte.

The *Scacchinella* bed are mostly in bihermal masses and they have the orange brown splotches so characteristic of the Wolfcamp. *Heliospongia* occurs in the WL masses but is not common and *Diplosphaera* is absent.

There seems to be only a small throw to the fault because the *Scacchinella* bed is thrown down toward the gully & can be traced to $\frac{1}{2}$ up from mouth of gully.

There is considerable yellow shale on the slope above *Scacchinella* at the supposed fault.

$\rho_{mm} = 10'$



(20)

September 19

Sight from hill 533° E from Decie House
The knot from which we travel

Coscinophora in sandstone Decie Hills is
underlain by thin sandstone and
angular sandstone & breccia. There is
a veneer of rubble on this lens. The
products were almost certainly not in
place. The Coscinophora could be in
place. Under the brown breccia beds
comes bihermal limestone and ls. cyl
probably 25-30' thick. Then comes the
brown breccia probably 200' thick.

Section near
hill 5300' in Decie hills.

Top of bed taken at a thin platy one.
Lowest 17' in platy sandy ls. in beds up to 1'
thick

At 34' comes a thick (2') limestone with
sandy chert layer of 1" on top. Below this
the rock has been partially covered
but is mostly the dark platy ls. Some
pinkish shale appears just below
the thick ledge. The thick ledge
abounds in large fusulines

At 70' this (6") ls bed contains *Spiriferophora*

At 80' clay shale in soil overlying a
thin ss. bed. 3" + 3" ls.

80'-92' clay shale

92-99' - harder yellowish shale
capped by 3" ls. bed.

99'-153' mostly shale with limestone
beds, cyl. beds (ls) up to a foot thick
At 153' comes a thick layer of smooth
limestone with bell-shaped. This layer
(nother lens) is 6' thick

*
Top West ledge, about
4600 ft 4650'

346.

(24)

714t =
S19

153'-169' Shale & ls. at 169' rock.
 becomes more massive the layers being
 2-3' thick. This is about beginning of ls. #1.
Spiridophora loose.

169'-185' - Thick massive bedded ls.
 separated by a few inches of shale.
 at 185' comes a bioherm about 20' thick
 Collected at base of bioherm.
 185'-205' bioherm.

205'-275' mostly thickbedded ss, sandy
 limestone with two thick chert beds in
 lower part.

275'-302' - Massive conglomerate with
 limestone and other pebbles.

Did not see any productive blocks
 but saw products like the little
 ones not in place.

Saw a boulder 3'x5' in ls #1 cgl.

S19'

Bioherm in Leonard #1 about
 $\frac{1}{2}$ mile northeast of S19.

S19² short section weathered ss, probably
 W.C. = 717X

Under The Hess ledge 60' of slope show
 blue and gray shales of The W.G. with
 occasional interbedded sandy ls. The
 shale contains much small pebble
 material.

The Hess covers 70' of slope &
 contains large *Heliospongia* with
Leptchinella.

Heads Edge about
 4650

(22) 0-75' above Hess - Heavy bedded sandy limestone with siliceous caps. Cgl beds. All separated by thin layers of shale.

At 75' comes a 5' bed of cgl. pebbles small closely packed. Butts laterally into biohermal ls. At 91' comes a ss bed limy in lower 1'; but pure sandstone in upper 4'. Above this point the slope is greatly covered but the float pieces are smaller generally. Probably considerable shale under the cover.

91'-142' mostly shale. At top a 1" ls.

142-192 - base of biohermal mass about 15' thick. Rock below mostly shale. Biohermal mass has large crinoid stems. Geometrical bryozoa.

197-212 - bioherm

212-218 - main mass of ls. #1

218'-258 - To base of a large bioherm saw huge crinoid stems at about 218'. The massive rock extends about 60' higher than the base of this bioherm. The upper beds at top of Leonard + / look like a sandstone about 20' thick. In the upper bioherm are masses of geometrical bryozoa; *Meekella grandis*. Huge crinoid stems occur as pebbles in rubble under + around the bioherm. The upper sandy beds lap onto the bioherm which thickens considerably locally.

One of the striking features of Leonard + / is the sand and enormous conglomerate. It is a repetition of the Hess Ledge.

5/19
NW

Fossils from large beachmark
Cork.

1600 ft
approx

H.

W.F. Col

Summit

2522

V.A.
Col

(23)

September 20

520

193' of slope above The Hess ledge
comes ls. #1 with lower beds
conglomeratic

$193' + 108' =$ Slope measurement of
Leonard #1. Then The top is ss. & ls cyl.
massive & like The Hess ledge below

Subtracting from the knot of the hill The
Hess ledge top is at about 4600'. Saw
no *Bacchimella* on way up.

Beaded Leptostid is in upper part of
Hess ledge at 520. It also has fine -
lined *Streptostylinium* with it. It
is likely or possible that 707 ls was
derived from The Hess ledge. Specimens
of *Coscidophora* obtained from Moore
may be Hess ledge. Check. - - -

The Leonard in The lower half
^{between Hess ledge & L#1}
is in heavy bedded sandy ls. Upper
half mostly shale.

The collecting along The Hess ledge
was not good. The silicified specimens
which Ietched and collected years
ago mostly come from 520 rather
than King's loc 35 which is about
 $\frac{1}{2}$ mile east. This too is different
from my big block which should
be given a special number. This
big block is definitely Hess ledge and
not float from Leonard #1. The
same is true of the *Stereostroma*
erected out.

0473

(24)

This afternoon collected from
Jawis locality at base of Mt.
The consist of numerous
brook-lined boulders well displayed.
One group of exposures extends
as a long tongue but the other
is under the west knoll of the
adjacent hill (about 4900' high).
The hill with long tongue is
faulted in comparison to the other.
Arthrosphaera occurs at this place.

Fossils are difficult to obtain and can
only be got by finding pieces that are
fairly well rotted. These are few in
number.

(25)

Det to Midland night of 23rd. With
Jack Edwards. Took few airmaps.

714a

Dick 9/22/57 - - - - \$10
522 - Gauelines = Leonard #1

Leonard

#2

714v

522¹ - small Knob of ls. About 50' on
east side of Knob. Gauelines &
Solenites, Coccinophora, Escalina
sample from SE side Hill & about
10' below top. Neospirifer, cup corals

Legend

#1

#2

Leonard
#2

522² - knob of biocalcareous thin bedded
ls. Some fossils on thin layers, fossils
broken into a brash. Many bryozoan
Entelletes, Proictostomaria & possible
Cnictella

522³ - Massive ls., biocalcareous many
bryozoans.

522⁴ high Knob, conglomeratic ls.
Saw loose Coccinophora, Entelletes,
Cnictella, Autosteges trigonatus

522⁵ - Belemnella in massive limestone
Two large ones seen in place. Many snails
714x

522⁶ - Bluff with platy yellow shale
capped by a 15" bed of shell breccia.
With silicified shell brash. Then
comes 10' unsorted silt with huge
crinoid stems. Above this is 40' of
granular limestone in flat beds
with silicified caps. Rhynchonella
Diplamus, Seynella?

1957

0475

(LB)

522⁵ The Scacchinella might have been a very badly damaged ventriloid

September 23

At stepped block A just E of

Windmill and just above Scacchinella beds along the base of the hill can be found some 10' of yellow Leonard shale in the slope. This underlies the beds with *Leibellula*. The top of the knob at about 4600' abounds in sponges & corals (cup). Dimples appear in the small saddle at about 4600'. King maps WC under small knob just E of hill 5021 on crown of the property. Check notes for description of this section.

Knob A or hill 5021 is mostly in granular moderately heavily-bedded limestone with occasional egl.(ls) layer especially one 10' t above the saddle and some scattered pebbles. Fossils are very scarce. Minor amount of bioturbal material present but save few fossils in it.

Knob B - On east side knob about 10' below top comes smooth gray rock with a few fossils. Scacchinella bed with *Leibellula*? No sponges & large *Wellella*

Saddle between A & C. The saddle is at 4900' and the head of Scacchinella reef masses form part of the surface of the saddle. Thus the Hess Scacchinella bed top is at 4900' and the base is at about 4840'. I estimate the cliff at 40' above the base and some 10' to the conglt. under it. The Scacchinella beds occur also 10' above the cliff making the

Windmill

0476

140

(D)

Windmill Hill

Saccatella bed about 60' thick.
 Above the *Saccatella* bed comes on the
 E side of the saddle 20' of slope with
 yellow shale. On the W of the saddle
 I measure 24' feet of slope in the
 shale plus about 20' covered which may be shale.
 The Head ledge here abounds in sponges.

523¹ *Saccatella* from top 5' of rock
 in saddle = 7142

West Knob C - 24' of shale are visible
 on E slope of Knob C but between
 here & base of cliff is covered which
 would add about 20' more. Shale has
 thin pebble beds like in lower Leonard.

On top of Knob C ~~climbed~~
 152' to top of Knob. This makes top of
 hill about 5050 which is higher than map
 measures, see notes on p. 28

4900

150

5750

715f =

717W

523² - *Stereosasma* - top of Knob C
 and *Geyerella* and *Saccatella* at very top.
 523³ - Sponge beds with pebbles like
 top of slipped blocks at A. This bed
 spans the ~~saddle~~ saddle between the
 Knob C and the northern knob.

Overlying this is about 75'-100'
 of slope with yellow shale, near
 top of which is smooth dark thick-
 bedded like that on Leonard with.

The ls 3-4 here is all dolomite,
 about 80' thick, lower half
 conglomeratic and with a go at top.
 The upper half is finer heavy-
 bedded dolomite. In the lower
 half fossils are fairly common.

(28)

Notes on Windmill Hill.

I think the map is inaccurate as regards the elevation of the saddle between knobs B & C. The actual distance between the two hills in the saddle is only 100 to 150' at the most but the map shows about $\frac{1}{8}$ mile. I think the knobs should be shown as two contours very close together to indicate the extremely narrow saddle. The elevation of the saddle would be 152' below the hill top. This hill is just under 5000 feet high and is almost as high as the hill A which is 5021. A good guess at the height would be 4995'. This would put the saddle at 4843' and the base of the Hess at 4763' approximately.

Geyerella and large belemnella were found on the very edge of the cliff at the highest point of Knob C. Both the Geyerella and belemn. are the very large forms and give a clue that these fossils at the top of the spur on the West side of the Sullivan Ramble Road really belong to Leonard #1. This is further supported by the Geyerellas found at 522' on the west end of the Deere Hills.

0478

(29)

September 24

Walking over spur at east end Devil Ranch to west the knot seems somewhat broken as the fault is approached. At the extreme west end of the spur some 30' of thin bedded clastic ls. overlies the *Saccinctella* beds, I believe to be Leonard #1. This is Leonard type rock like that overlaying the Leonard #1 on the main masson of the Mtn.

Handcapping of section between Hess ledge and Leonard #1 horizon in first gully west of spur.

758

0-55' above Hess ledge, platy thick layers of detrital ls. separated by beds of yellow shale. float block full of large *Saccinctella*
55'-116' mostly yellow shale.

116'-171' The shale becomes bouldered and has thick beds of ls. up to 2' thick but separated by 10-15' of shale.

At 171' comes biohermal ls. and what appears to be the base of Leonard #1. Saw no brach in this bioherm but big *Leptodus* is present. Huge crinoid stems in bottom of this lump are about 2 1/2" in diameter.

Limestone #1 measures exactly 130' to head of gully where there is a small fault displacing top about 20'. Biohermal limestone occurs through the entire

0479

30

Thickness. One sees many associates of *Scaevlinella*, such as *Gryphella*, *Lingella* and sponges but I saw only one possible *Scaevlinella*. They must be abundant however in some places because of the float pieces with them which we saw lower down. The section of Leonard #1 may be 10-20' too thick on account of the fault. This may may account for the low position of the first bioherms encountered.

715g

524' - Up east nose of hill 4920. The lowest rock in the hill, 20 or 30' contains bioherms and suggests Leonard #1. It took a *Leptodus* here. This is overlain by yellow shale probably near 75' thick. Above this comes ls 3 + 4 which consist of smooth dark sandy ls. with sandstone caps with a little yellow shale between. Goniophiles are common in this rock. This ls. is completely different from Leonard 1 + 2. The top knot of the hill is in conglomeratic ss. The bituminous limestone in beds of a few inches to a foot or more, the fairly even bedding and the abundance of goniophiles are in striking contrast to the biohermal ls #1 of the Leonard.

524² - top of knob is in egl. with shell breccia

524³ - This is probably upper part of ls #1 of Leonard, massive flat bedded dolomitic limestone. Some surfaces covered by fossils. *Spiriferidophora*, small *Micella*, small fine-lined *Neospirifer*.

(31)

S²⁴³ actually looks like the heavy beds of detrital ls just on top of Leonard #1. Beds of yellow shale suggest this and the presence of *Chonetes*.

715h

S²⁴⁴ - About 100 yds east of S²⁴³ comes massive limestone cgl with huge crinoid stems. This is truly the top of Leonard #1. Dick found *Scaphopinella* in this lump about 15' below top. Only about 20' of low part of the east nose of the hill is in the massive ls #1. The limy detrital Leonard just #1 above is about 30-35'. Dick then comes the shaly beds followed by bituminous, goniatite-bearing Leonard.

S²⁴⁵ small mound ls #1 with brachi & Entelites.

0481

September 25.

715i

Collected in morning on Word #4 hill at elbow of Head Canyon NE of divide. Good section in hill, yellow shaly rock at bottom, thin bedded ls with cylinders of siliceous material, heavy bedded ls. Making ledges, dark somewhat bituminous limestone. Fossils not abundant.

Afternoon packed boxes and wrapped blocks.

Mileage on leaving Marathon 170 20

Blocks collected

7066	- - -	2
702c	- - -	3
706-	- - -	3
513-513 ^b	- - -	3
518'-714p	- - -	1
5226 714g	- - -	1
5224 714w	- - -	5
525 = 715i	- - -	1

~~1869 pounds.~~

3 boxes at 521 "

Total shipment 2390 pounds.

Sept. 27

Refused admission at Neal Ranch.
Returned to Marathon and shipped collections. Left Marathon at 11:45.